Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A semiconductor device composed of one or more insulating or semi-insulating layers, one conducting semiconductor layer, two conducting pads, and a layer of at least one single-stranded DNA probe, wherein:

said conducting semiconductor layer is on top of one of said insulating or semi-insulating layers, said two conducting pads are on both sides on top of an upper layer which is either said conducting semiconductor layer or another of said insulating or semi-insulating layers, making electrical contact with said conducting semiconductor layer, and said layer of at least one single-stranded DNA probe is directly adsorbed on the surface of said upper layer, between the two conducting pads,

wherein exposure of said single-stranded DNA probe to a sample containing a target DNA or RNA, under hybridization conditions, causes either a current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads

~~(3)~~ or a change in the electric potential required to keep a constant current.

Claims 2-4 (Cancelled).

5. (Previously Presented) A semiconductor device according to Claim 1, wherein said conducting semiconductor layer is a semiconductor selected from a III-V and a II-VI material, or mixtures thereof, wherein III, V, II and VI denote the Periodic Table elements III=Ga, In; V=As, P; II=Cd, Zn; VI=S, Se, Te.

6. (Previously Presented) A semiconductor device according to Claim 1, wherein said conducting semiconductor layer is doped n-GaAs or doped n-(Al,Ga)As.

7. (Previously Presented) A semiconductor device according to Claim 1, wherein the one or more insulating or semi-insulating layers, that may serve as the base for the device, is a dielectric material selected from the group consisting of silicon oxide, silicon nitride and an undoped semiconductor selected from a III-V and a II-VI material, or mixtures thereof, wherein III, V, II and VI denote the Periodic Table elements III=Ga, In; V=As, P; II=Cd, Zn; VI=S, Se, Te.

8. (Original) A semiconductor device according to Claim 7, wherein said undoped semiconductor is undoped GaAs or undoped (Al,Ga)As.

9. (Previously Presented) A semiconductor device according to Claim 6, wherein said conducting semiconductor layer is a layer of doped n-GaAs which is on top of a semi-insulating layer of (Al,Ga)As which is on top of another semi-insulating layer of GaAs, and on top of said conducting semiconductor doped n-GaAs layer there is a semi-insulating undoped GaAs layer to which is attached said layer of said at least one single-stranded DNA probe.

10. (Previously Presented) A semiconductor device according to Claim 6, wherein said conducting semiconductor layer is a layer of doped n-(Al,Ga)As which is on top of an insulating layer of undoped GaAs which is on top of a semi-insulating layer of GaAs, on top of said conducting semiconductor doped n-(Al,Ga)As layer there is a semi-insulating undoped (Al,Ga)As layer on top of which there is an upper undoped GaAs semi-insulating layer, and said layer of at least one single-stranded DNA probe is attached to the upper undoped GaAs semi-insulating layer.

11. (Previously Presented) A semiconductor device according to Claim 1, wherein said at least one single-

stranded DNA probe comprises a sequence complementary to a sequence of a target DNA or RNA.

12. (Original) A semiconductor device according to Claim 11, wherein said at least one single-stranded DNA probe comprises a sequence complementary to a mutation sequence of a gene responsible for a genetic disease or disorder.

13. (Original) A semiconductor device according to Claim 12, comprising two or more single-stranded DNA probes each of said probes comprising a sequence being complementary to a mutation sequence of a gene responsible for a genetic disease or disorder.

14. (Previously Presented) An array of semiconductor devices according to Claim 1, wherein each device in the array carries a different DNA probe.

15. (Original) An array of semiconductor devices according to Claim 14, wherein at least one of said devices in the array carries a DNA probe comprising a sequence complementary to a sequence of a target DNA or RNA.

16. (Previously Presented) An array of semiconductor devices according to Claim 15, wherein at least one of said devices in the array carries a DNA probe comprising a sequence complementary to a mutation sequence of

a target gene responsible for a genetic disease or disorder and at least another of said devices in the array carries a control DNA probe comprising a sequence complementary to the sequence of the normal gene corresponding to said mutation.

17. (Previously Presented) A method for the detection of a target DNA or RNA which comprises:

(i) exposing the single-stranded DNA probe of at least one semiconductor device according to Claim 1 to a sample containing the target DNA or RNA, under hybridization conditions; and

(ii) monitoring either the current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads or measuring the change in the electric potential required to keep a constant current.

18. (Original) A method according to claim 17, wherein said single-stranded DNA probe comprises a sequence complementary to a sequence of said target DNA or RNA.

19. (Previously Presented) A method for the detection of a target DNA or RNA which comprises:

(i) exposing the single-stranded DNA probe of an array according to claim 14, to a sample containing the target DNA or RNA, under hybridization conditions; and

(ii) monitoring either the current change resulting from the hybridization process when a constant electric potential is applied between the two conducting pads or measuring the change in the electric potential required to keep a constant current.

20. (New) A semiconductor device composed of one or more insulating or semi-insulating layers, one conducting semiconductor layer, two conducting pads, and a layer of at least one single-stranded DNA probe, wherein:

said conducting semiconductor layer is on top of one of said insulating or semi-insulating layers, said two conducting pads are on both sides on top of an upper layer which is either said conducting semiconductor layer or another of said insulating or semi-insulating layers, making electrical contact with said conducting semiconductor layer, and

said layer of at least one single-stranded DNA probe is directly adsorbed on the surface of said upper layer, between the two conducting pads,

said at least one single-stranded DNA probe on the surface of the upper layer comprises means for causing either (1) a current change resulting from a hybridization process when a constant electrical potential is applied between the two conduction pads, or (2) a change in electric potential

required to keep a constant current, when said single-stranded DNA probe is exposed to a sample containing a target DNA or RNA, under hybridization conditions.